determining that the quality is worth at least four times as much as sending a low-resolution fax in 1/4 the time.) The same analysis applies to any transmission that involves the transfer of a stream of data of fixed length.

In other applications, the duration of a call is mostly determined by other factors, such as the length of a videoconference or information database session. In these cases, perceived quality is more of a factor. For some applications, the perceived quality difference will simply be the difference in the length of time spent waiting to fill a screen with text or images. For others, such as desktop videoconferencing, the difference will be a sharper picture and less jerky movement. These factors will tend to make the session shorter and more efficient, and, in many cases, determine whether the application is used at all. The real value is in the efficiency increase of the participants. Everything considered, the factor of four quality multiplier seems reasonable for the subjective measurements as well.

For local access, the monthly price of ISDN, in most jurisdictions, will lie between the price for one and two analog access lines. But since ISDN provides the equivalent of two access lines, it will provide a price savings to customers that need both voice and non-voice communications. For long-distance calls, the per-minute charges for an ISDN and a voice call should be nearly equivalent because the same technology is used for both. Thus, ISDN will increase quality by the factor of four, discussed above, without increasing the price to the customer[5].

For higher bandwidth services, the analysis is similar. The minimum PAMS rate of 1.5 Mb/s is roughly 24 times faster than narrowband ISDN or 96 times as fast as modems. However, in the near term, 1.5 Mb/s service will be priced higher. For example, today's 1.5 Mb/s private line connections are about six times as expensive as narrowband connections. Thus, on a per dollar basis, the quality of 1.5 Mb/s service is about four times that of 64 Kb/s service. Over time, the price of 1.5 Mb/s service will likely decrease relative to narrowband service. When this happens, the effective quality advantage will increase.

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[5] Customers will also need to purchase ISDN-compatable terminal equipment. However, TFI expects that (1) the price of this equipment will fall rapidly, as is usual with computer equipment, and (2) ISDN functionality will be integrated with other functions in communications and computer equipment, such as fax , LAN , and codec cards. To the average ISDN user, the equipment investment will be comparable to that for modems, the alternative technology. Thus, the need to purchase equipment is neutral, or insignificant, in determining the relative quality of ISDN.

Translating the quality index for digital communications into an overall quality index for telecommunications presents some challenges. First, digital communications services will not become immediately available to all subscribers, and once they do, not all potential subscribers will use them. Second, digital subscribers will continue to use voice services and will not necessarily see proportional quality increases for these services. To account for the first factor, the quality improvement index is weighted by the percentage of access lines used by ISDN or PAMS subscribers. For the second factor, it is assumed, very conservatively, that there are no appreciable quality improvements for voice services in the future and that, for digital subscribers, voice and non-voice services are equally important. For example, if 5% of access lines are accounted for by ISDN subscribers and 1% by PAMS subscribers, TFI computes the quality index as follows:

Q=[Voice:94%*1]+[ISDN:5%*(50%*1+50%*4)]+[PAMS:1%*(50%*1+50%*16)]=1.15

This treatment causes the overall quality index to increase quite slowly over time because it is linked to the gradual adoption of new services.

V. Infrastructure Requirements for Digital Services

Because of its reliance on much of the existing infrastructure, the incremental requirements for ISDN are relatively modest, but, nonetheless real. Many LECs already have plans for many of the required network elements, including digital switching, Signaling System 7, digital loop carrier (where necessary), and the appropriate generic switching software. These form the basis of ISDN availability in the sense that a customer can subscribe to ISDN if they want to. ISDN line cards in the switch (or in DLC remote terminals), and ISDN network terminating equipment are required on a per-subscriber basis as customers sign on, except that a sufficient stock must be kept on hand to minimize service order intervals. Because line cards comprise up to 60% of the investment in a local switch, the impact of ISDN on network investment can be very substantial when summed over all subscribers.

PAMS requires massive changes in all of the major categories of network investment, specifically switching, outside plant, and circuit equipment. The switches must be upgraded to Asynchronous Transfer Mode (ATM), all of the circuit equipment needs to be upgraded to Synchronous Optical Network Equipment (SONET), and in the outside plant,

all but the last link to the customer needs to be on fiber optics. While the interoffice and long distance networks are already mostly fiber, the loop network (feeder and distribution) is mostly copper. Fiber in the loop (FITL) is a practical requirement for any *large-scale, mass market* implementation of PAMS services, including those providing only 1.5 Mb/s access.

SONET

SONET is a new format for organizing information on a fiber optics channel that recognizes the need for integrating different types of traffic on the same pair of fibers. Among its many advantages are standardized optical and electrical interfaces that all suppliers will adhere to. Another is that an individual information stream on a fiber channel can be efficiently separated from the rest of the information on the channel. With a SONET add-drop multiplexer, any signal can be extracted with a single piece of equipment, without breaking down the whole signal. SONET add-drop multiplexers are already cost-competitive with asynchronous equipment, and soon will be commodity items that are integrated into almost every piece of circuit (and switching) equipment. This will render redundant much existing circuit equipment, including digital crossconnects and multiplexers.

ATM

ATM switching is optimized to handle all types of traffic on the network efficiently and quickly. ATM's first implementations are being made in private data networks and in premises networks. As more voice, image, and video traffic is added to the existing traffic on these networks, severe performance problems are going to emerge, and ATM switching is the solution. Public ATM networks will have to wait until internetworking standards are finalized, but soon the same standardized, high-performance switching protocol will dominate public networks, private networks, and premises networks, seamlessly integrating all types of communications.

FITL

In the feeder and distribution network, the large-scale deployment of FITL is essential for mass market access to PAMS. FITL refers to any architecture that extends fiber to an area of no more than several hundred customers; the last link to the customer may be on copper pairs, coaxial cable, or fiber. A true consensus has yet to emerge, in either the telecommunications or cable television industries, on the exact architecture, number of customers per fiber, and typical length of the last link. Continuing changes in technology, costs, regulation, business relationships, and market forecasts probably mean consensus will be arrived at only gradually. Although these details are critical to many network planning decisions, for this high-level analysis the specification of FITL is sufficient.

Because PAMS requires an almost total replacement of the telephone network, the LEC's existing infrastructure provides them few advantages over new competitors. In fact, their existing infrastructure puts them at a disadvantage since they must bear the costs of transistioning from old to new. These problems are made more difficult by the fact that the optimal network topology for PAMS may bear little resemblance to the topology that was optimized for voice services over copper wires and electromechanical switches.

VI. Base Case Forecasts of Technology Deployment, Service Availability, and Service Adoption

Technology Deployment

For the analysis, TFI used the current TFI forecasts for technology deployment as a base case. These forecasts were developed under the sponsorship of the Telecommunications Technology Forecasting Group (TTFG), an organization of North American LECs. They are the same forecasts that were filed in the USTA's recent comments in response to the Commission's *Order Inviting Comments* regarding depreciation simplification[6].

TFI used these forecasts for the base case because (a) they are consistent with WEFA's baseline assumptions for telecommunications investment, (b) they are consistent with the

[6] Comments of the United States Telephone Association, in response to the Commission's *Order Inviting Comments*, FCC Docket No. 92-296, December 17, 1993.

availability of mass market digital services in a reasonably timely manner, (c) they are consistent with recent rates of adoption of new technology, and (d) they are reasonable goals for the country. However, they are *not* consistent with FCC-prescribed depreciation rates, which imply much longer adoption times.

The Relationship Between Technology Deployment and Service Availability

For service to be available to a customer, the right network components must be in place. To simplify, TFI assumed that the percentage of customers that have access to a service is proportional to the percentage of access lines that are served by the lagging required network element[7]. For example, the percentage of customers with PAMS available is assumed to be the smaller of the following:

- The percentage of access lines served by SONET.
- The percentage of access lines served by ATM switches.
- The percentage of access lines served by FITL.

Sometimes there are ways to work around some availability issues. For example, a customer served by an analog switch can be served remotely. Or a customer not served by fiber could be served on copper using compression technology. In fact, TFI's forecast for FITL assumes the latter, in recognition of the difficulties in ramping up fiber availability. However, these are stopgap measures that are not consistent with the economical provision of digital services on a mass market scale. They are of limited use and then only in the early years of adoption. Therefore, in modeling the relationship between network technology and service availability, stopgap technologies were ignored.

[7] This is a simplification because it assumes that when a lagging network element is installed, the leading elements are already in place at the same geographical location, which might not always be true. For example, suppose Area A comprises 20% of all access lines. Suppose further, that FITL has 30% penetration overall and 80% penetration in Area A, while ATM has 20% penetration overall with 100% penetration in Area A. In this case, ATM and FITL would simultaneously be present in only 16% of all locations instead of 20% as assumed. However, for this level of analysis, the simplification is reasonable because one would expect telcos to place the technologies in the same places in order to maximize service capabilities.

The Relationship Between Service Availability and Service Adoption

Soon after a new product is introduced, it is usually available to anyone willing to purchase it. Therefore, the adoption rate is more related to price, quality, and benefits than to availability. With services that require a large infrastructure investment, however, many people who would like the service cannot get it, perhaps for many years. In these circumstances, the number of subscribers to a communications service is a function of both availability as well as the other factors. Exhibit 2 shows the base case assumption for full-service ISDN availability and adoption. (The relationship is derived from a prior TFI analysis of the historical availability and adoption of four television-based services.) The availability forecast is more conservative than often quoted in the industry because it assumes (a) full end-to-end, nationwide, standardized service, (b) the upgrading of large numbers of digital switch line cards in anticipation of customer orders, (c) resolution of tariff and regulatory issues, and (d) the availability of appropriate terminal equipment to the mass market.

Exhibit 3 shows the base case availability and adoption forecasts for PAMS. For most years, the availability is driven by ATM adoption, which is forecast to lag the adoption of SONET and FITL. The base case implies that PAMS is available on 10% of access lines by 2000 and 34% by 2004. Based on this level of availability, we would expect 21% of access lines adopting PAMS by 2004, if historical adoption patterns of mass market products and services are followed.

VII. The Impacts of Accelerating Investment

The Relationship between Investment and Technology Deployment

TFI constructed a model to determine annual LEC investments required by any given technology deployment schedule. New technology deployment was modeled on an industry level for the major LECs. The model breaks out investment requirements for nine important new network technologies, including digital switch upgrades, SONET, ATM, and FITL. These investments are required to achieve the modernization programs discussed above. Also modeled, in less detail, are the ongoing requirements to invest in (1) old technologies to provide for growth, (2) upgrade programs that do not change the

basic technology type, copper rehabilitation, for example, and (3) modernization in equipment categories other than outside plant, switching, and circuit equipment.

TFI applied the model to the base case and determined that the investment requirements were almost identical to the WEFA model base case. TFI then accelerated the base case technology deployment in the major network categories to match the investment increase expected from LEC price cap reform. Exhibit 4 shows the LEC investment required under the two cases. For the period between 1995 and 2004, the accelerated case will require a cumulative increase in investment of roughly $22 billion, averaging $2.2 billion annually or 10% of base case investment. This is consistent with Darby's estimate of the increased investment stimulated by price-cap reform, which ranges from 5% in 1995 to 15% in 2004.[8]

The Impact on New Service Availability and Adoption

New service availability in the accelerated case was determined from the accelerated deployment patterns, in the same manner as in the base case. The left hand pair of curves in Exhibits 5 and 6 show the impact on ISDN and PAMS availability, respectively. Everything else being equal, the impact of increasing availability is to increase the adoption rate.[9] The right hand pair of curves in Exhibits 5 and 6 show the impact on adoption of accelerating ISDN and PAMS availability, respectively, assuming the same availability/adoption relationship used in the base case.

For either service, a given level of availability comes one or two years sooner under the accelerated case than under the base case. Likewise, adoption under the accelerated case leads adoption under the base case by one to two years. Or, put another way, by the year 2000, we would see a 29% greater ISDN adoption and, by 2004, 38% greater PAMS adoption.

[8] The exact timing is different because, under the accelerated case, much of the modernization will have been completed by 2004. Fully optimizing the increased investment over the various technologies, instead of applying it evenly across technologies as TFI did in this analysis, would eliminate this difference.

[9] Of course, if a service becomes available quickly enough, the latent adoption pattern emerges and further acceleration of availability has little impact. However, the TFI forecasts for service availability are in the region where availability acts as a constraint on adoption.

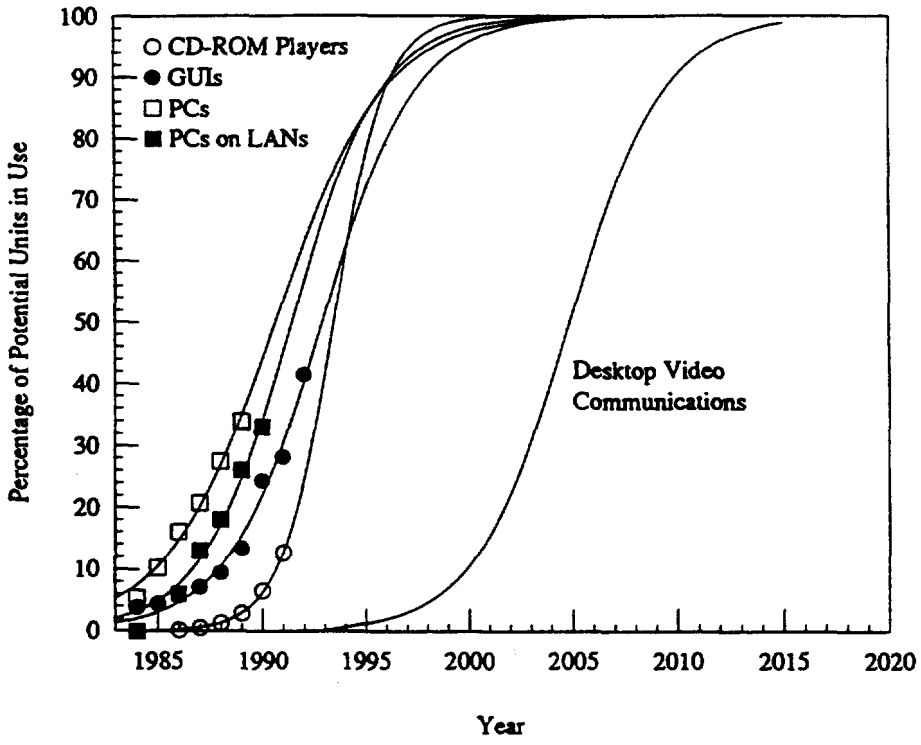
As discussed earlier, the benefits of network modernization are reflected in a quality index that incorporates both the data rate of the services and their level of adoption. Accelerating availability accelerates adoption which, in turn, accelerates the increase in the quality index. Exhibit 7 compares the quality index for the base case and the accelerated case. By 2004, the quality index is 19% higher for the accelerated case, which is consistent with the 1-3% annual improvement assumed by WEFA.

VIII. Closing Thoughts

In the large scheme of things, advancing the mass market availability of new communications services by a year or two may seem not so important. In business, though, a year or two is eternity, usually spelling the difference between failure and success. For example, every year a small research firm cannot access the same communication tools as its larger competitors is a year at risk. Whether a multimedia software developer has a viable interactive teaching product may depend on how many schools and homes can access it, not in 1999, but in 1997. For a telephone company, missing the first year or two of market exposure with a new service may prevent it from ever being successful. And, in a world where technological prowess is so important, a lost year or two of experience may make the crucial difference in our nation's competitiveness.

Exhibit 1

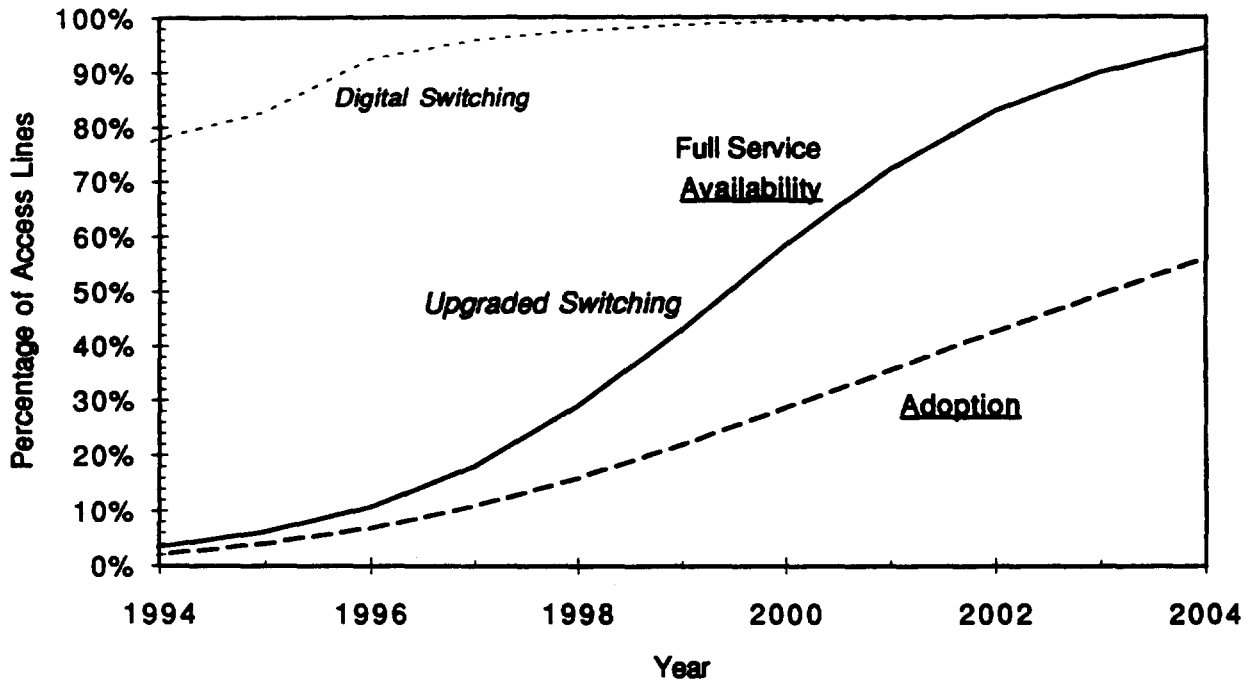
Forecast Market Adoption of Desktop Video Communications



Source: Technology Futures, Inc.

Exhibit 2

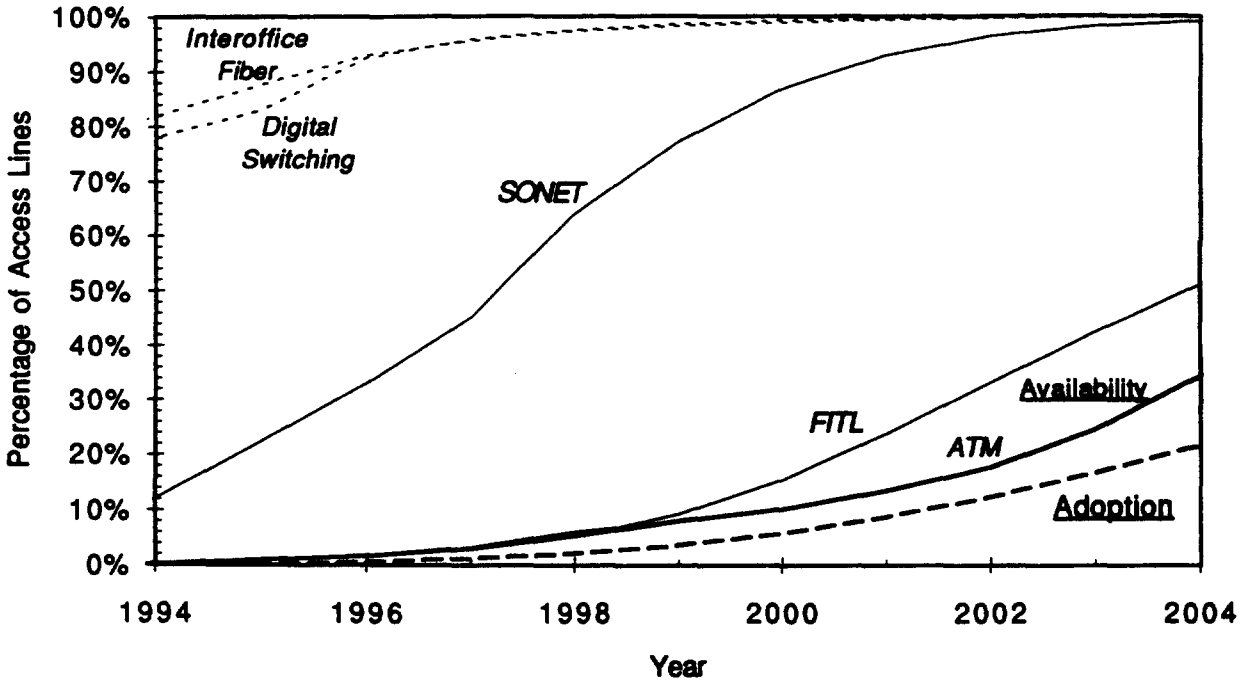
Full Service ISDN Availability and Adoption
Base Case



Source: Technology Futures, Inc.

Exhibit 3

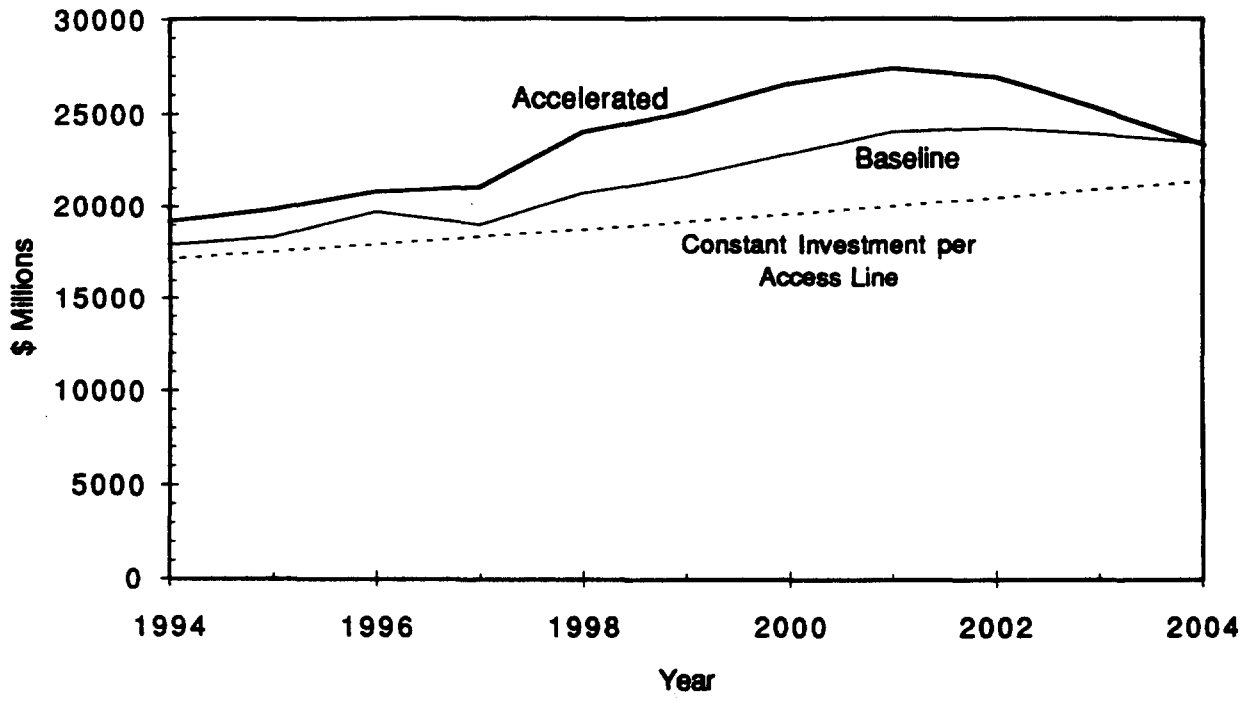
Public ATM-Switched Multimedia Services (PAMS)
Base Case



Source: Technology Futures, Inc.

Exhibit 4

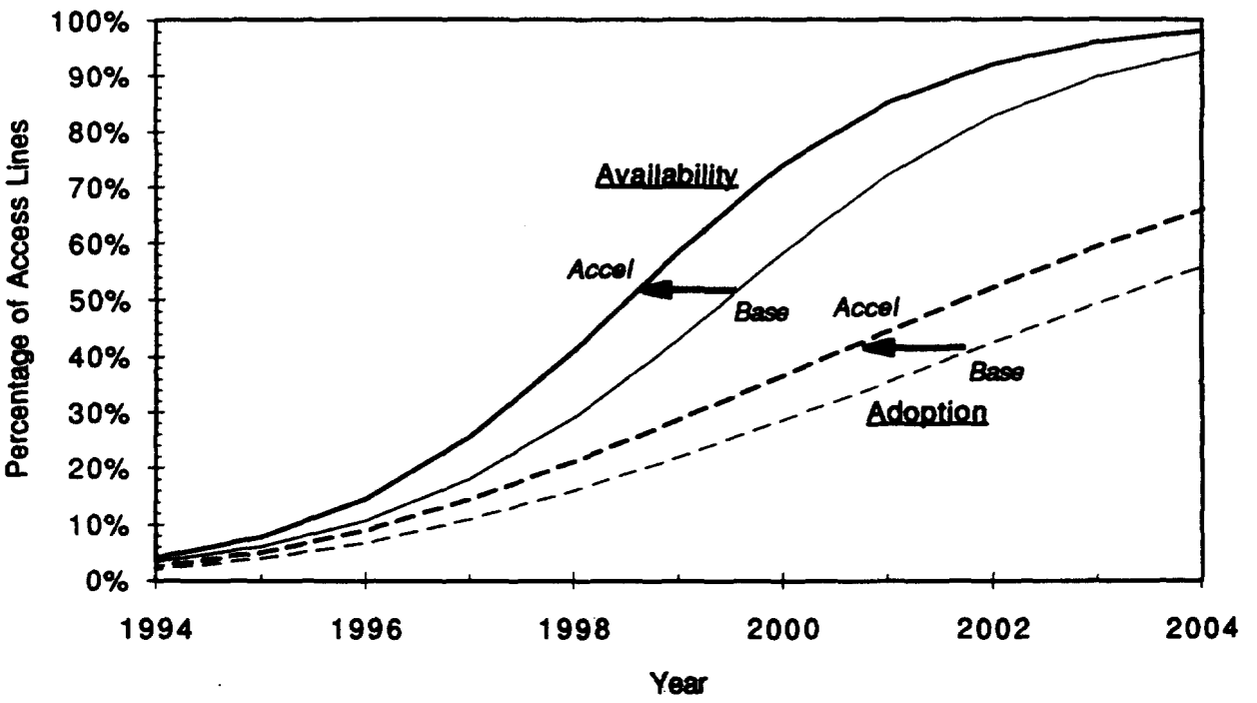
Annual LEC Investment



Source: Technology Futures, Inc.

Exhibit 5

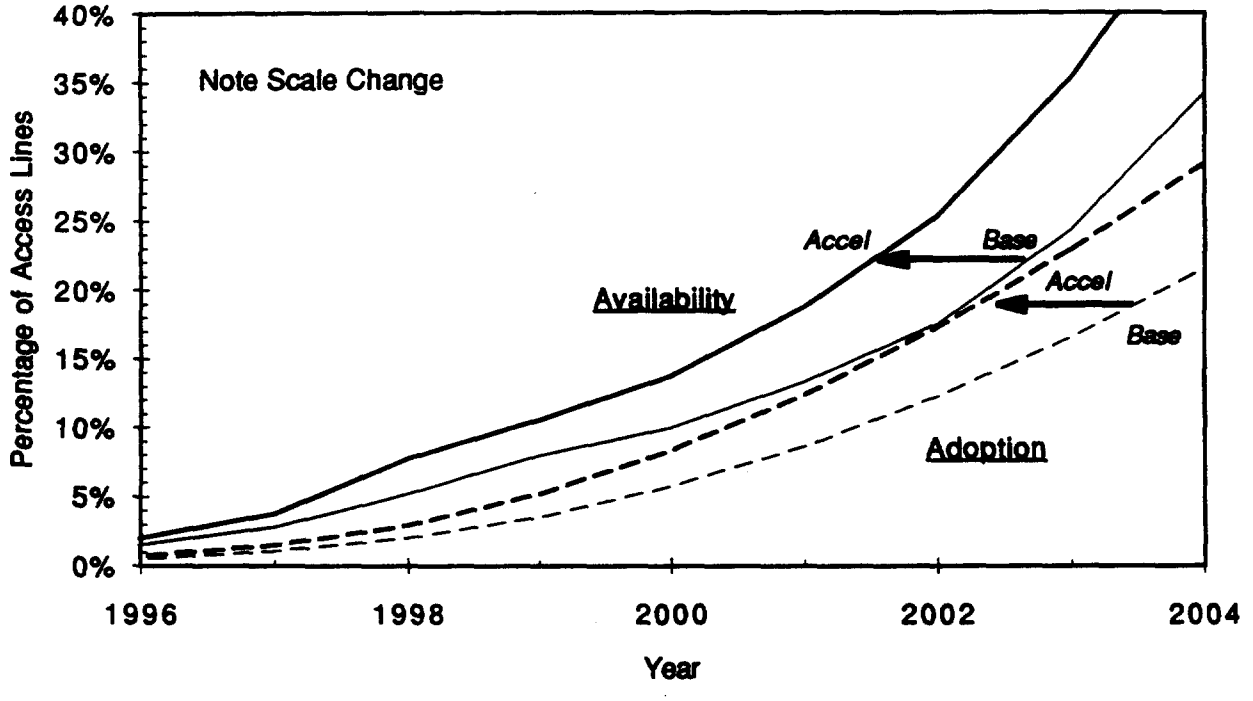
Impact of Accelerated Investment -- ISDN



Source: Technology Futures, Inc.

Exhibit 6

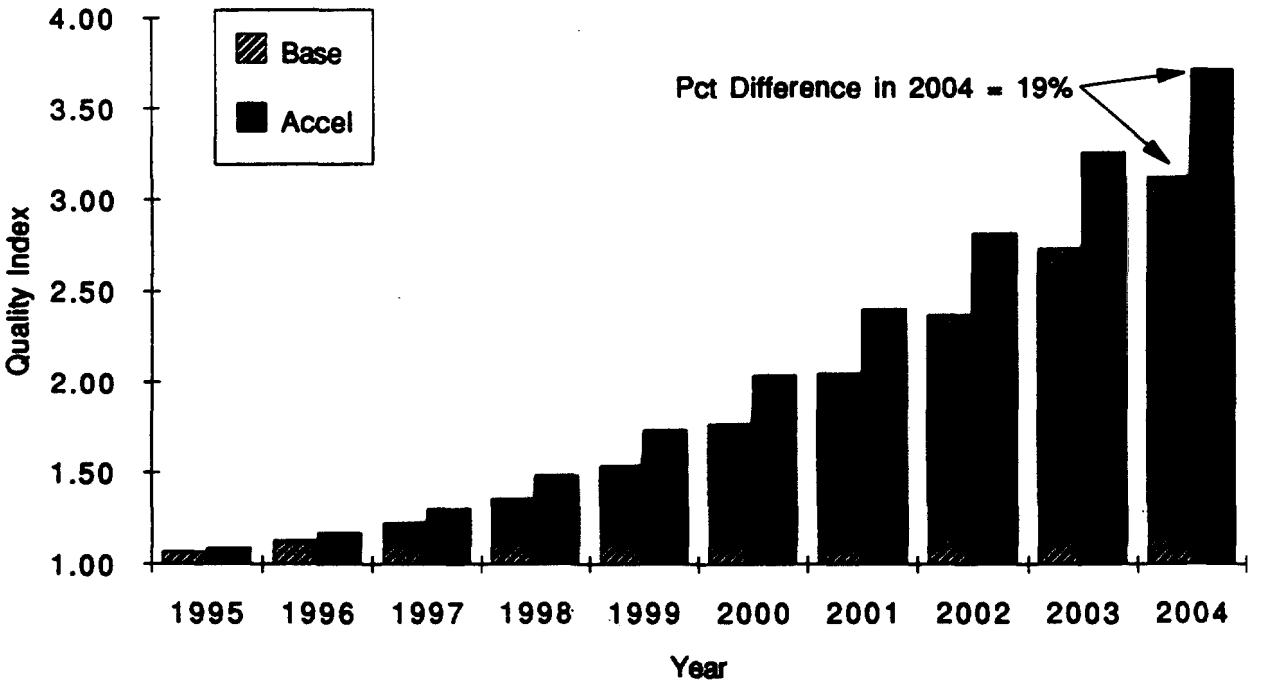
Impact of Accelerated Investment -- PAMS



Source: Technology Futures, Inc.

Exhibit 7

Impact of Accelerated Investment -- Quality Index



Source: Technology Futures, Inc.

ATTACHMENT 9

Competitive Market Area Demonstration and Data Reporting Requirements

USTA Position Paper

TABLE OF CONTENTS

COMPETITIVE MARKET AREA DEMONSTRATION
AND
DATA REPORTING REQUIREMENTS

I) EXECUTIVE SUMMARY

As local exchange carrier markets become increasingly competitive, it is essential that the FCC's regulations adapt by permitting local exchange carriers greater flexibility to respond to customer needs and competitive offerings. This need for reform of the Commission's rules was recognized by the United States Telephone Association ("USTA") in its formal request to the FCC for the establishment of a proceeding to consider USTA's wide-ranging proposal for access reform.[1] The need for reform has also been recognized by the FCC in its recent Price Cap Notice of Proposed Rulemaking in which the Commission seeks comment on how Price Cap Regulation may be modified to accommodate a transition to a more competitive local exchange market.[2]

USTA's proposal matches the level of regulation in a local exchange market to the extent of competition in that market and includes a mechanism to measure the extent to which customers in a particular market have access to competitive alternatives. USTA believes that addressability -- rather than market share -- should serve as the keystone of any such mechanism. Because local exchange carriers cannot be expected to provide information about the capabilities of their competitors, USTA believes that the Commission must collect data on an ongoing basis from all market participants.

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1 See, Petition for Rulemaking -- Reform of the Interstate Access Charge Rules, United States Telephone Association, September 17, 1993.

2 See, Notice of Proposed Rulemaking, CC Docket 94-1, Price Cap Performance Review for Local Exchange Carriers, released February 16, 1994 ("Price Cap Review").

In this paper, USTA sets forth a proposal which would permit the Commission to collect, on an ongoing basis, information sufficient to determine the extent of competition in each LEC wire center,[3] as well as a mechanism to classify the wire center as a Competitive Market Area.[4] The proposed mechanism would require competitive access providers and other interstate common carriers to include Service Area Descriptions as a part of their interstate tariffs. These Service Area Descriptions could be used by LECs to demonstrate that an access market meets the criteria established by the Commission to measure the extent to which customers of local exchange carriers have competitive alternatives, and thus, the extent to which the Commission can rely on market forces rather than regulation in those markets.

II) *BACKGROUND -- HISTORICAL PERSPECTIVE OF THE CURRENT ACCESS STRUCTURE, USTA's ACCESS REFORM PROPOSAL, AND THE FCC's PRICE CAP REVIEW*

The current interstate access structure, rates and rules have evolved little from the Commission's decisions of 1983. If the access environment had remained static, the Commission's original access charge plan and its resulting policies and rules might have continued to satisfy its objectives. However, rapidly evolving technologies, new market entrants and new procompetitive Commission policies have dramatically changed the access environment. The 1983 framework, characterized by rigid rate structure definitions and pricing restrictions for switched access which bear little relation to underlying demand or economic cost, is inconsistent with the competition and technology which existed in 1983 and with the evolving conditions which will exist in 1994 and beyond. Within the current rules, the Commission cannot encourage competition in the access market and expect to continue to meet its original objective to promote universal service. Ultimately, the public interest benefits of the original plan have diminished and customers have suffered accordingly.

In recognition of the rapidly changing telecommunications environment, in September 1993, USTA submitted a Petition for Rulemaking

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3 The USTA Access Reform Proposal classifies LEC wire centers as either IMAs (Initial Market Areas), TMAs (Transitional Market Areas) or CMAs (Competitive Market Areas) -- with increasing levels of pricing flexibility as the level of competition increases. A summary of the USTA Proposal is included in Section V herein.

4 A LEC may also use the mechanism to evaluate a reasonable grouping of wire centers as a part of a larger market area. In this instance, each wire center in the grouping may be classified as a CMA.

to the FCC which proposed modifications to the FCC's regulations which were designed to tailor the degree of regulation to the level of competition within a market area, permitting local exchange carriers increasing flexibility to introduce new services and establish pricing, as competition increases in a market area.

The USTA proposal includes provisions for moving the services provided in competitive wire centers outside of Price Cap regulation. Such wire centers are referred to as Competitive Market Areas ('CMAs'). Services in a CMA would be subject to substantially reduced regulatory oversight, including the ability to offer contract-based services (i.e., individual case basis pricing), reduced notice periods for tariffs (such as 14 days for new services and for contracted services), and the elimination of cost and demand support requirements.

The USTA Access Reform Proposal included a threshold standard that a wire center must satisfy before it could be moved to a CMA.[5] The standard generally requires that customers, representing 25% of the LEC's demand in the wire center, have available an alternative source of supply, and are actively pursuing alternatives to the LEC's network through the solicitation of bids, or the construction of their own network.

In its Price Cap Review, the FCC is also addressing the need for transitioning from the 'baseline' price cap plan toward the relaxation of regulatory oversight and rate regulation as competition develops in the market for local exchange access services. As stated in the press release announcing this NPRM, the Commission seeks comments on:

- The current state of competition for local exchange services and interstate access and the criteria that should be used in identifying when reduced or streamlined regulation should take effect;

- The regulatory methods that should be adopted for LEC services as those services become subject to greater competition;

- Whether and how the Commission should schedule revisions to price cap baskets as local exchange access competition develops . . .

In its Access Reform Proposal, USTA describes a mechanism to adjust

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5 For the convenience of the reader, this paper discusses the satisfaction of the CMA threshold standard for a single wire center. It should be noted that the USTA proposal also permits LECs to demonstrate the threshold standard has been satisfied for a reasonable grouping of wire centers.

price cap regulation as competition develops in each market area. In this paper, USTA proposes one procedure to demonstrate that the customers in a LEC's wire center have sufficient alternative suppliers so that a LEC may request that wire center be designated as a CMA, thus affording the LEC pricing flexibility consistent with the degree of competition in the wire center.

III) *ECONOMIC THEORY SUPPORTS INCREASING PRICING FLEXIBILITY WITH INCREASING COMPETITIVE ALTERNATIVES*

The FCC has sought to promote competition in markets for interexchange services, information services, and, most recently, interstate access services. This policy has been based on the recognition that a competitive market will assign resources more efficiently, promote more rapid innovation, and provide consumers with more choices more effectively and efficiently than any system of regulation the Commission could devise.

The purpose of regulation is to serve as a substitute for competition in those markets where competitive pressure is not sufficient to impose market discipline on the providers.[6] While necessary in those cases, regulation is, at best, an imperfect substitute for competition -- as the Commission has recognized in establishing a pro-competitive policy. As competition develops in a market, it is important for the Commission to reduce the degree of regulation in that market, to permit competitive market forces to replace the artificial substitute provided by regulation. Such a policy will:

- Provide correct price signals to potential entrants. If the incumbent LEC is not allowed to respond to competition, new firms may make inefficient investments based on prices which differ from those a competitive market would set.[7]

- Allow the incumbent firm to compete effectively. As the price cap Notice observes: "price and service regulation of the LECs could unnecessarily restrict the LEC's ability to compete, and thus deny the full benefits of competition to consumers."[8] To the extent that

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6 One of the reasons the Commission adopted price cap regulation, in place of rate of return regulation, was that it found that price caps would more closely approximate the incentives in a competitive market. See Price Cap NPRM at Para. 12.

7 Once inefficient entry has occurred, these entrants will become stakeholders in the regulatory process, where they will seek to protect themselves by prolonging regulatory price umbrellas.

> regulation of LEC services creates an umbrella for alternative providers, it will reduce the market pressure on these carriers to offer consumers the best possible prices and service. As the Commission has found in the interexchange market, most of the benefit consumers realize from a pro-competitive policy comes in the form of rate reductions and new service options from the incumbent firm.

The time to establish the ground rules under which this transition should occur is at the outset, not after some threshold level of competition has been reached. This will allow new entrants, as well as customers, to make their decisions based on a reasonable expectation concerning the prices they will face.

In the interexchange market, the Commission followed a policy of streamlining its regulation of AT&T as competition developed. In the access market, where three customers account for more than 90% of the demand, it is likely that competition will develop much more rapidly than it did in the interexchange market. It is important, therefore, that the Commission should act now to establish a framework for this transition, rather than attempt to deal with it after the fact on an ad hoc basis.

One advantage of establishing a framework for transition is that no particular threshold level of competition must be reached before the framework itself is established. If, in a particular market, competition has not yet reached the "trigger" level established as part of the framework, then adopting the framework will have no effect in that market, and customers there will still be protected by regulation. However, some markets will meet the threshold at the outset, and streamlining regulation selectively in those markets will benefit consumers. Further, as additional markets satisfy the "trigger" criteria, streamlining can occur in those markets with a minimum of delay, cost, and uncertainty if the procedure to be followed has been established in advance.

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8 See Notice at para. 94.

IV) STREAMLINED REGULATION SHOULD BE TRIGGERED WHEN ACCESS CUSTOMERS HAVE COMPETITIVE CHOICES

A) Market Power

Where regulation is used as a substitute for competition, its purpose is to prevent the abuse of market power. Therefore, in deciding when and where to reduce regulation as competition develops, the key criterion for the Commission should be whether the incumbent retains market power to raise prices above competitive levels. Once this market power has gone, the purpose of regulation has gone with it. Any trigger mechanism for the streamlining of regulation in a new access charge framework should therefore be based on some indicator of market power.

The degree of market power possessed by the incumbent firm is given by the elasticity of demand for that firm's product. If that elasticity is relatively high, the firm will not be able to raise prices above competitive levels.[9] This firm demand elasticity has two components. One is the elasticity of the final demand for the service -- this is the elasticity a sole provider would face in the absence of competition. The second is the elasticity of substitution -- the customer's ability to shift to another supplier, or to a substitutable service. As competitive alternatives become available, this second component will increase. Any attempt by the incumbent to raise prices will drive customers to these alternatives. The issue of market power, then, comes down to a simple question: Does the customer have choices available? This is the essential criterion which should drive a trigger mechanism.

What begins as a question of demand elasticity therefore becomes a question of the availability of alternative sources of supply. Is a provider of a substitutable service present in the relevant market? If customers chose to shift a significant amount of demand to that provider, would the provider have the capacity to serve that demand?

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9 In a textbook case of perfect competition, the firm's demand would be infinitely elastic. However, few markets actually look like the textbook case. In most markets that a reasonable person would consider highly competitive -- markets where intense rivalry exists among firms, where effective market pressure exists, and where customers benefit from innovation and low prices -- each firm has some market power. In fact, the incentive that drives quality improvement and new product development in these markets is each firm's desire to differentiate its product, and thereby create a temporary competitive advantage.

B) The Relevant Market

To answer these questions, one must first define the market to which they will apply. When the Commission evaluated the level of competition in the interexchange market, it considered the market on a national level. Customers for interexchange service wanted ubiquitous termination, and the ability to use the service when they traveled. They also may have had more confidence in the ability of a large, nationwide carrier to meet their requirements. Within this national market, distinct submarkets existed for different services, such as 800 service. The Commission therefore evaluated competition on a service-by-service basis, making its determination for each service on a nationwide basis.

The conditions in interstate access markets are very different. Access markets are essentially local in nature. The availability of an alternative supply in New York does the customer in Pittsburgh little good.[10] The question of market power for access services can therefore be answered only for a specific geographic area. Since no nationwide market exists for access, any market measure aggregated at a national level would be misleading. Such an aggregation would roll up some local markets which are more competitive with some which are less competitive. By doing so, it would obscure the very differences across these markets that the Commission would be seeking to reveal through its trigger mechanism.

Moreover, access services are highly substitutable for one another. Most access services are sold at a wholesale level to large, sophisticated purchasers - IXCs, ESPs, and large end users. These wholesale markets are less subject to product differentiation than retail markets. A customer can employ different arrangements of access services to satisfy the same demand. For example, the combination of a LEC special access facility and an IXC's Megacom-type service provides the end user with the same function as the combination of the LEC's switched access and the IXC's MTS service.[11] Conversely, as the bandwidth and control features of the switched network improve, switched access will become a closer substitute for special access in the transmission of large quantities of data. It may not be appropriate, therefore, to define access markets exclusively on a service-by-service basis.

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10 Clearly, customers for local access services are willing to accept a provider which lacks a nationwide presence. They have done so for years when they purchased local telephone service and cable television service.

11 Note that, in this example, the IXC becomes an alternative provider of local switching to the customer. In a Megacom arrangement, the customer's loop is homed on the IXC's switch, which then becomes the first point of switching for that customer.